GENI Infrastructure Build

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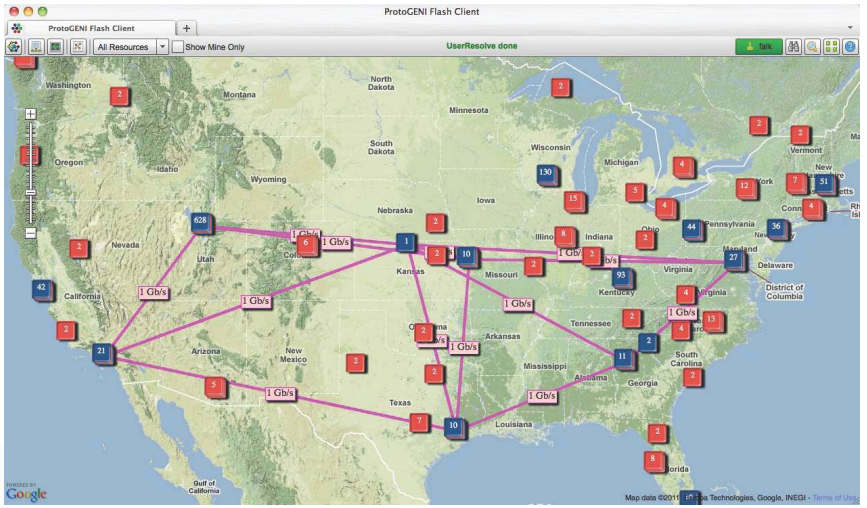
www.geni.net

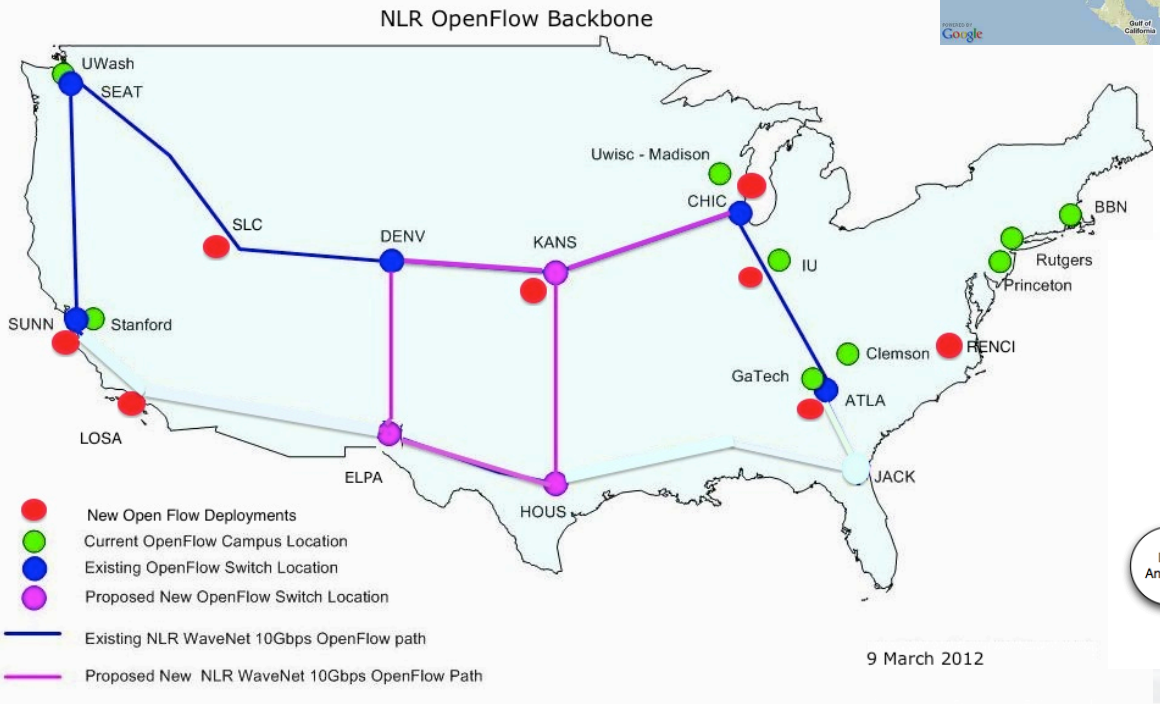
What's in the infrastructure?

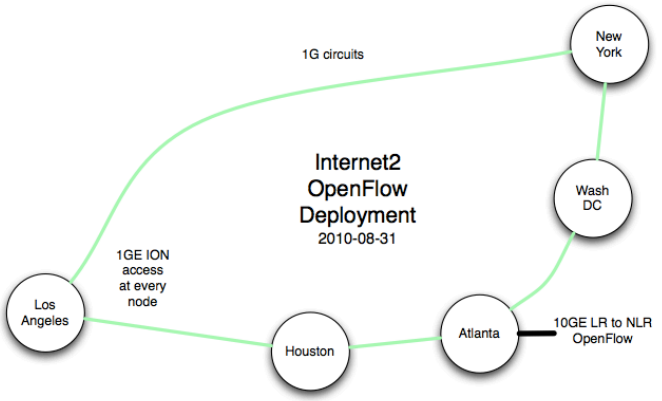
- GENI Core Networks
- GENI Regionals
- GENI Racks
  - GENI Racks Status
  - Acceptance Tests
- Support

GENI Core Networks

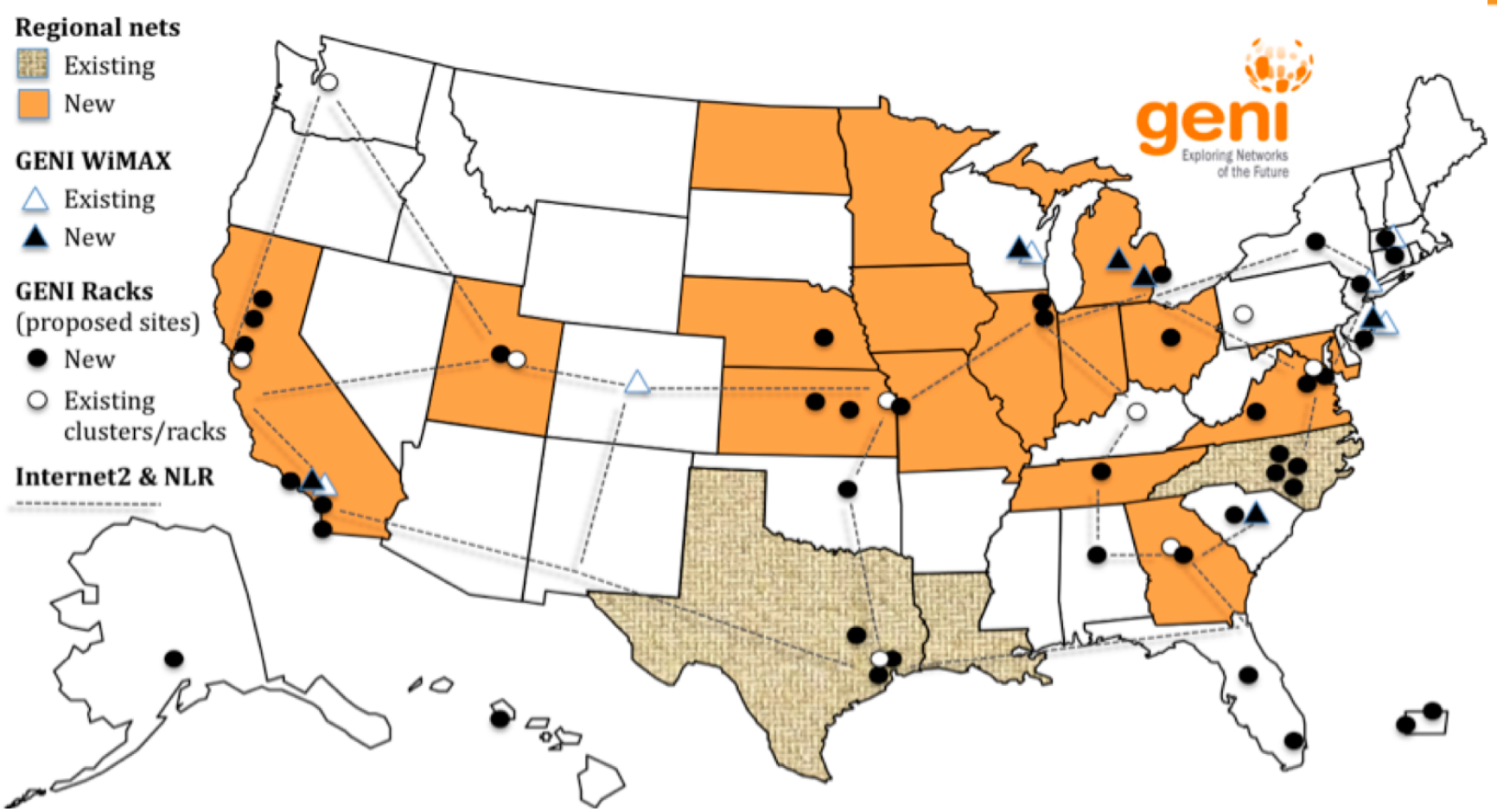
- Three core networks connect with various hw/sw at L2 with GENI AM API
  - NLR expanding core topology
  - Internet2 may get faster L2 links
  - ProtoGENI links at L2 to racks
- Plans to connect with more nationwide research networks like DREN, ESNet

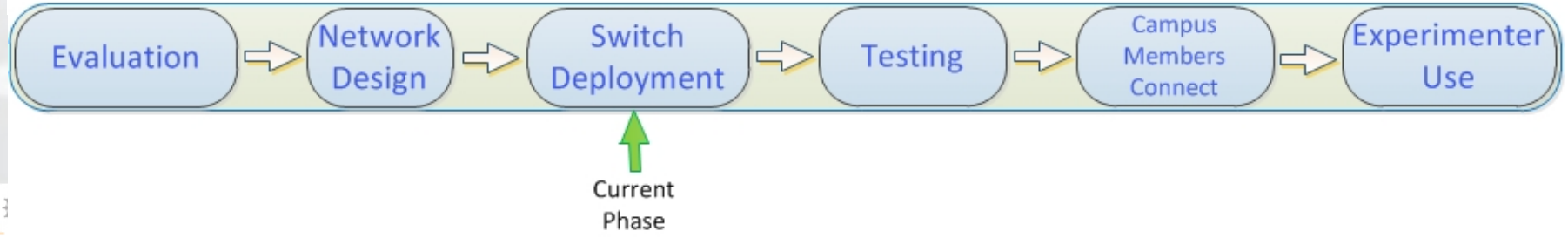




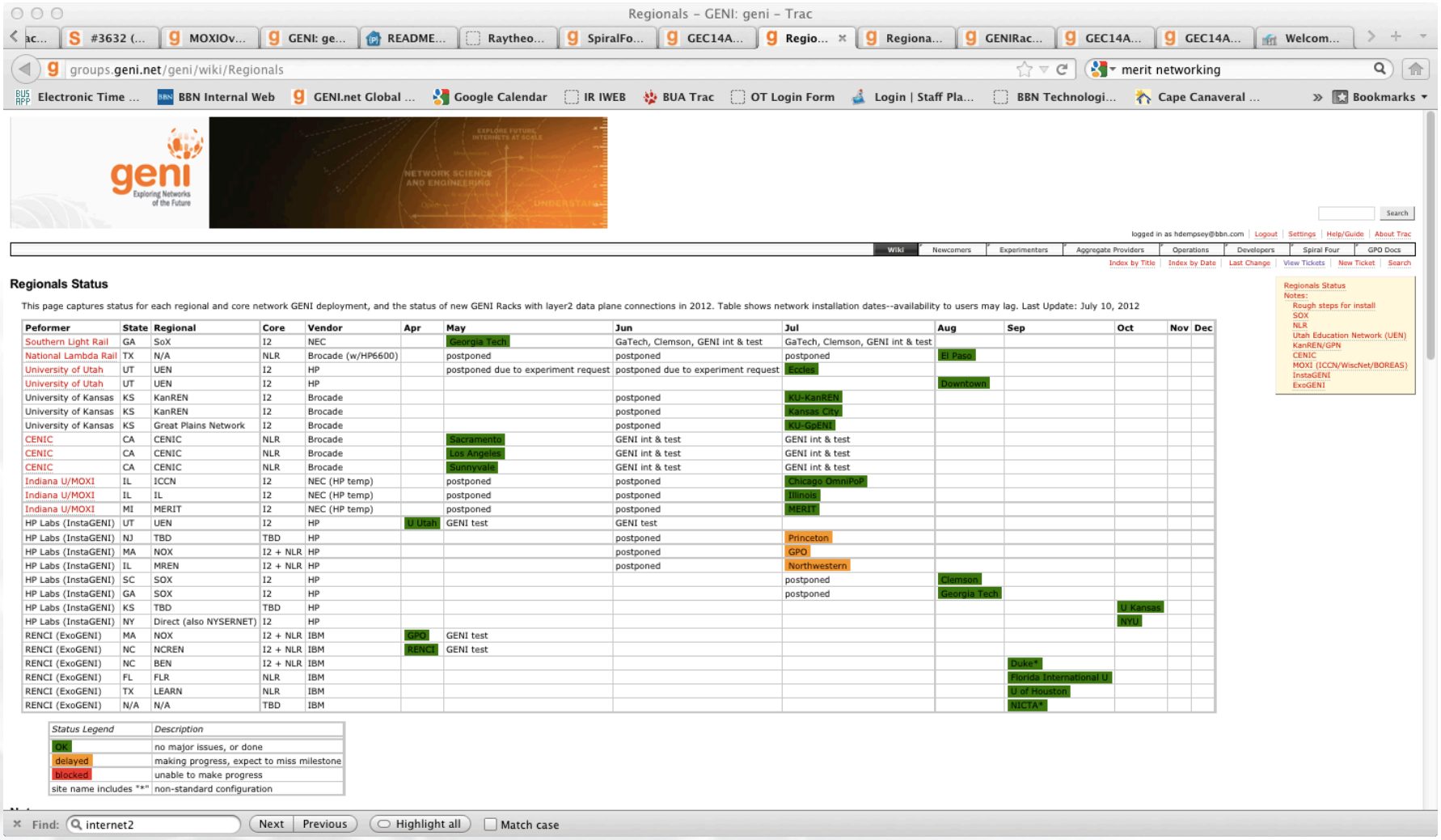


Mesocale Overview





Meso-Scale Spiral 4 Deployments



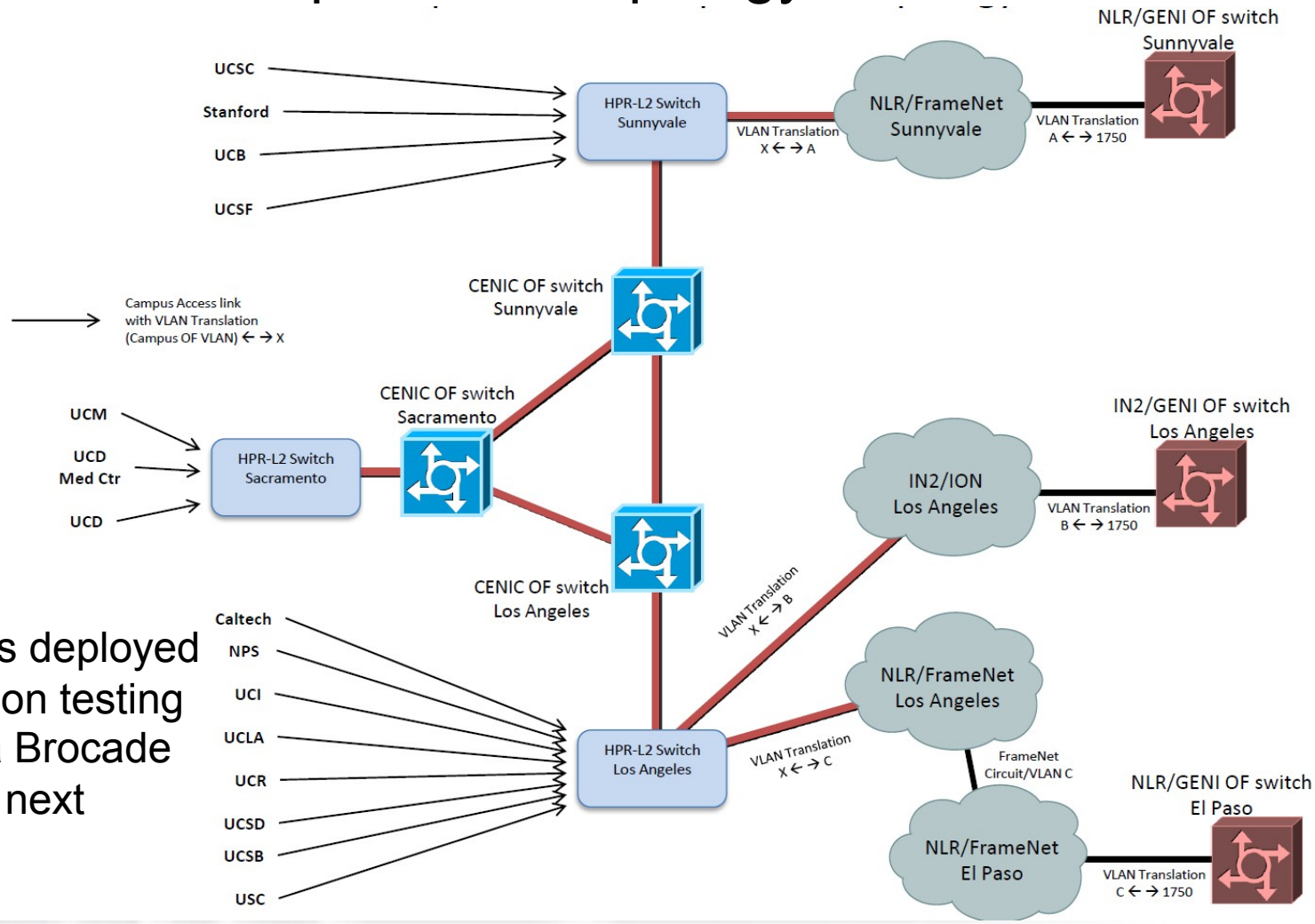
Peformer	State	Regional	Core	Vendor	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Southern Light Rail	GA	SoX	I2	NEC		Georgia Tech	GaTech, Clemson, GENI int & test	GaTech, Clemson, GENI int & test					
National Lambda Rail	TX	N/A	NLR	Brocade (w/HP6600)		postponed	postponed	postponed	El Paso				
University of Utah	UT	UEN	I2	HP		postponed due to experiment request	postponed due to experiment request	Eccles					
University of Utah	UT	UEN	I2	HP					Downtown				
University of Kansas	KS	KanREN	I2	Brocade			postponed	KU-KanREN					
University of Kansas	KS	KanREN	I2	Brocade			postponed	Kansas City					
University of Kansas	KS	Great Plains Network	I2	Brocade			postponed	KU-GpENI					
CENIC	CA	CENIC	NLR	Brocade		Sacramento	GENI int & test	GENI int & test					
CENIC	CA	CENIC	NLR	Brocade		Los Angeles	GENI int & test	GENI int & test					
CENIC	CA	CENIC	NLR	Brocade		Sunnyvale	GENI int & test	GENI int & test					
Indiana U/MOXI	IL	ICCN	I2	NEC (HP temp)		postponed	postponed	Chicago OmniPoP					
Indiana U/MOXI	IL	IL	I2	NEC (HP temp)		postponed	postponed	Illinois					
Indiana U/MOXI	MI	MERIT	I2	NEC (HP temp)		postponed	postponed	MERIT					
HP Labs (InstaGENI)	UT	UEN	I2	HP	U Utah	GENI test	GENI test						
HP Labs (InstaGENI)	NJ	TBD	TBD	HP			postponed	Princeton					
HP Labs (InstaGENI)	MA	NOX	I2 + NLR	HP			postponed	GPO					
HP Labs (InstaGENI)	IL	MREN	I2 + NLR	HP			postponed	Northwestern					
HP Labs (InstaGENI)	SC	SOX	I2	HP				postponed	Clemson				
HP Labs (InstaGENI)	GA	SOX	I2	HP				postponed	Georgia Tech				
HP Labs (InstaGENI)	KS	TBD	TBD	HP							U Kansas		
HP Labs (InstaGENI)	NY	Direct (also NYSERNET)	I2	HP							NYU		
RENCI (ExoGENI)	MA	NOX	I2 + NLR	IBM	GPO	GENI test							
RENCI (ExoGENI)	NC	NCREN	I2 + NLR	IBM	RENCI	GENI test							
RENCI (ExoGENI)	NC	BEN	I2 + NLR	IBM						Duke*			
RENCI (ExoGENI)	FL	FLR	NLR	IBM						Florida International U			
RENCI (ExoGENI)	TX	LEARN	NLR	IBM						U of Houston			
RENCI (ExoGENI)	N/A	N/A	TBD	IBM						NICTA*			

Status Legend	*Description*
OK	no major issues, or done
delayed	making progress, expect to miss milestone
blocked	unable to make progress
site name includes "*"	non-standard configuration

Regional interconnections and campus/regional GENI rack current status at http://groups.geni.net/geni/wiki/Regionals

Regional Example: CENIC (California)

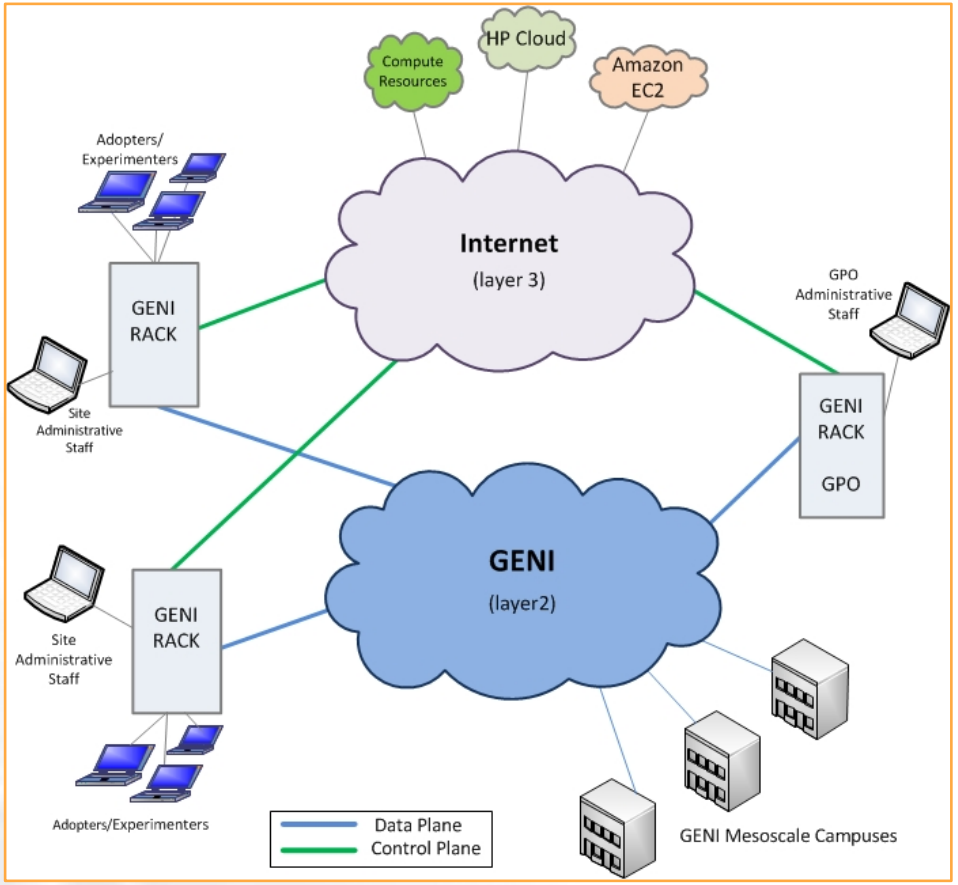
CENIC GENI OpenFlow Topology



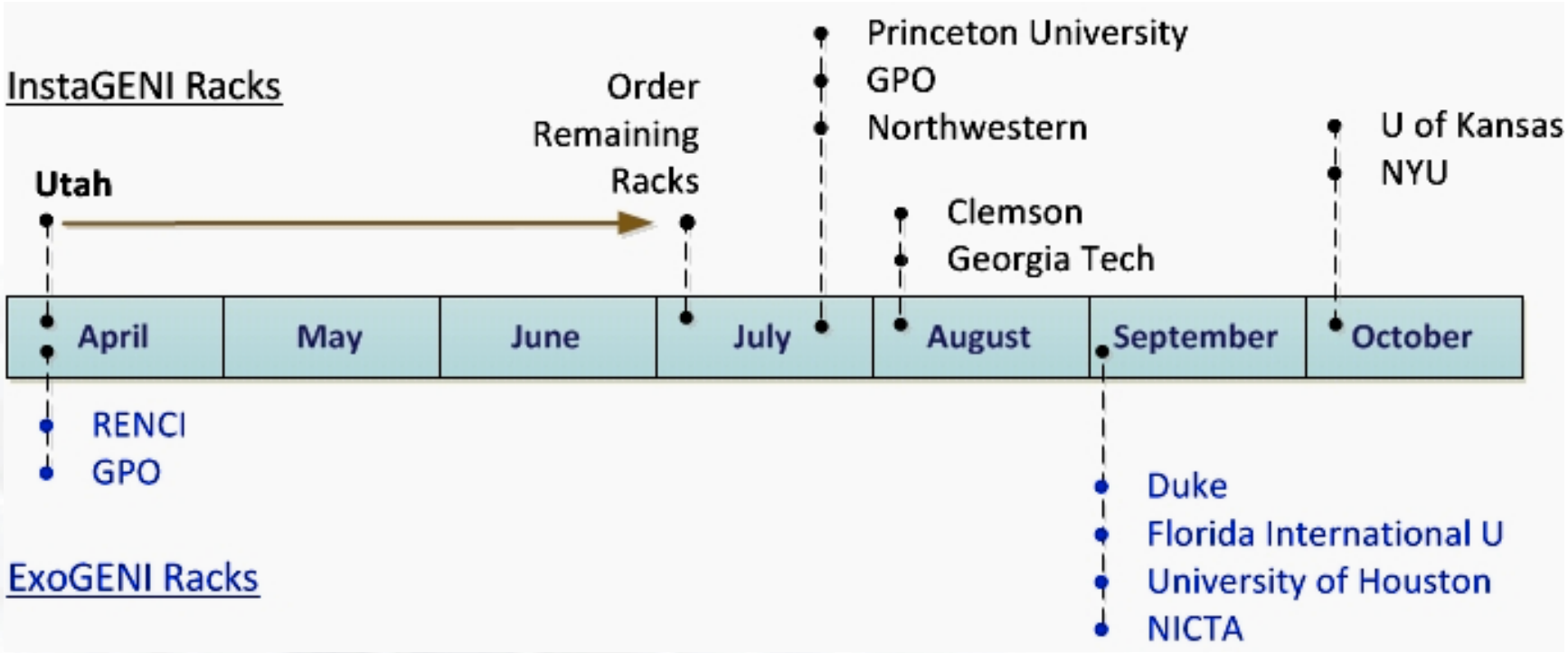
- Switches deployed
- Integration testing with beta Brocade software next

GENI Racks

- GENI Racks projects are expanding available GENI infrastructure in the US.
- Racks provide reservable, sliceable compute and network resources using Aggregate Managers.
- GENI AM API compliance
- GENI RSpec v3 support
- Federation with Slice Authorities (GPO GENI, ProtoGENI, PlanetLab Central)



GENI Racks Status

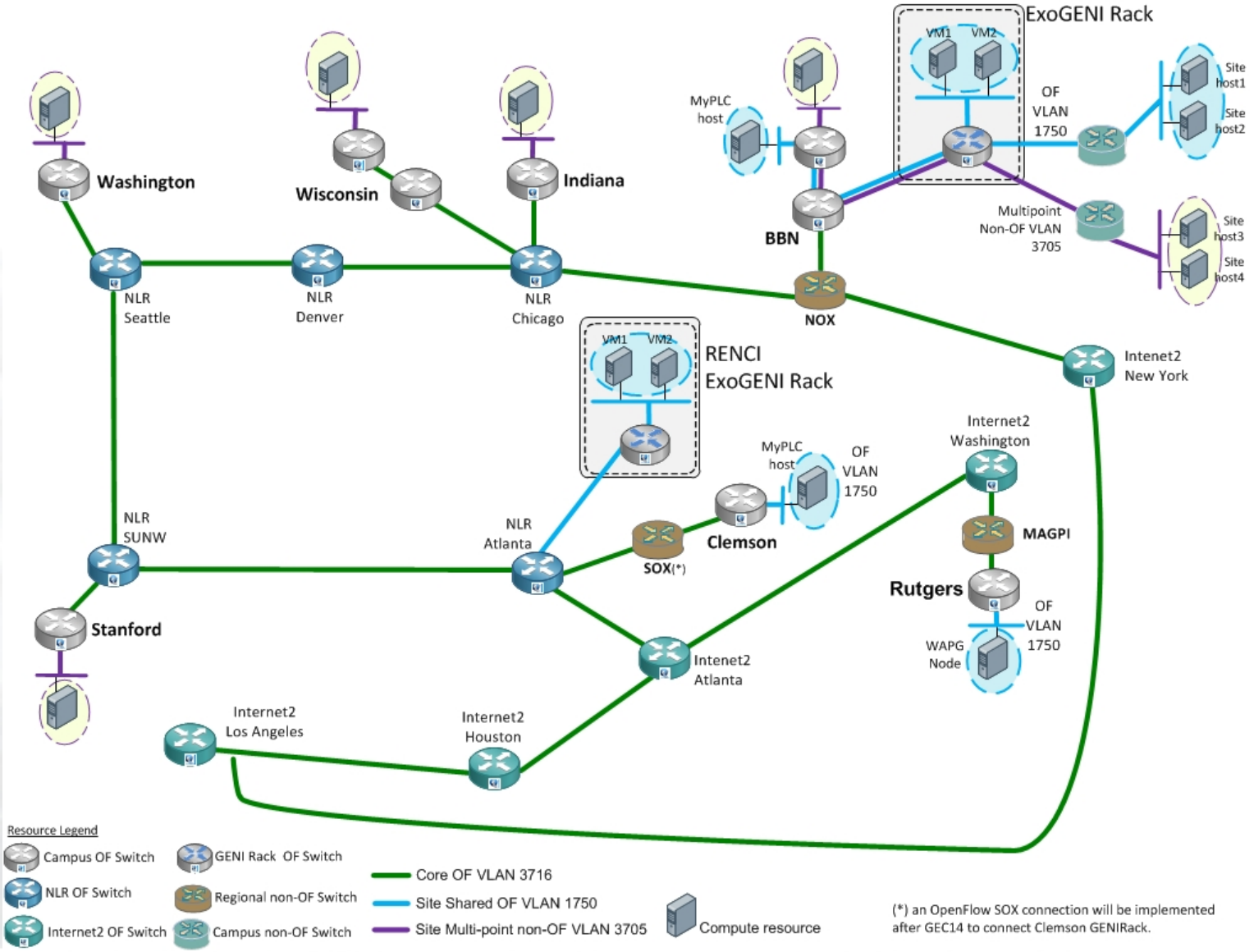


- Deployment plans for 2012 and current status at http://groups.geni.net/geni/wiki/Regionals
- Spiral 5 deployments will ramp up quickly
- USIgnite interest in metro starter racks continues

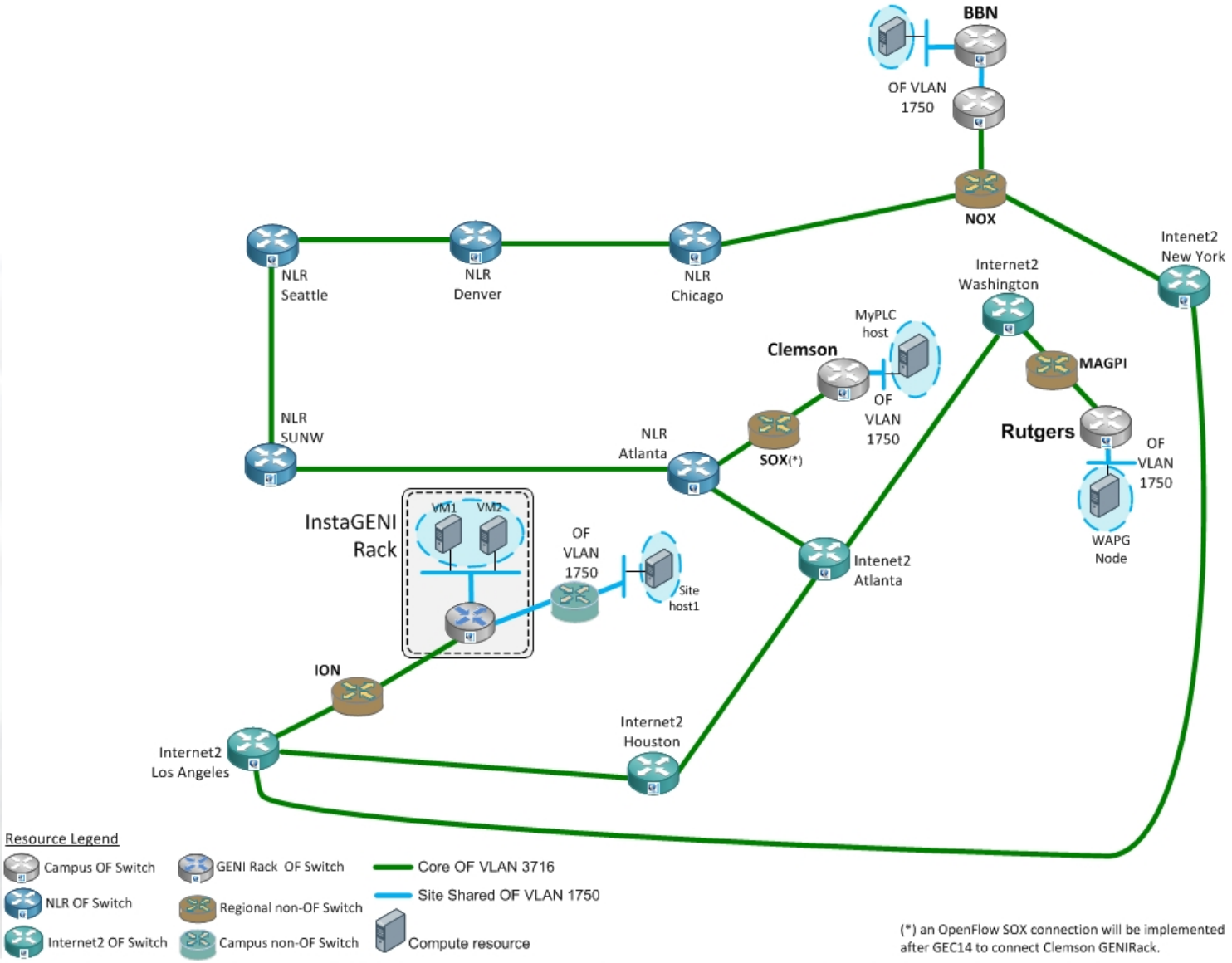
GENI Rack Acceptance Tests

- GPO is performing Software and System Acceptance Tests for each of the GENI rack implementations: ExoGENI and InstaGENI.
  http://groups.geni.net/geni/wiki/GENIRacksHome/AcceptanceTests
  http://trac.gpolab.bbn.com/gcf/wiki/AmApiAcceptanceTests
- Validate GENI AM API software interoperability and rack system integration including:
  - Services and resources available to experimenters
  - Administrative functions for campus/IT personnel
  - Potential experiment topologies
  - Experimenters' access to resources
  - Interoperability with existing Meso-scale aggregates
  - Monitoring features and GMOC data collection
  - GMOC rack operations and procedures

Interoperability Experiment: ExoGENI



Interoperability Experiment: InstaGENI



Evolving Production Support

- Help:
  - help@geni.net mailing list
  - GMOC helpdesk http://gmoc.grnoc.iu.edu/gmoc/index/support.html
  - Credential setup, ops assistance at GEC coding sprints
    http://groups.geni.net/geni/wiki/GEC14Agenda/CodingSprintAndExperimenterTutoring
  - IRC/chat (informal)
    http://groups.geni.net/geni/wiki/HowTo/ConnectToGENIChatRoom
- Prototype monitoring and status for Meso-scale sites:
  - http://monitor.gpolab.bbn.com (at GPO)
  - http://gmoc-db.grnoc.iu.edu (at GMOC)
  - GMOC GENI rack prototype monitoring (not public yet): request GMOC accounts for testing
- Emergency Stop Procedure tests completed
- *GMOC Concept of Operations* revision pending GENI rack projects acceptance test completion

A Toast to Campuses and PIs!

- Some campus projects finish this year, but sites are continuing in meso-scale
- Creating a rich, varied fabric of programmable networks and compute nodes for experimenters
- Thank you!